

ANNEX A

Methodology for Estimating Emissions of CO₂ from Fossil Fuel Combustion

Carbon dioxide (CO₂) emissions from fossil fuel combustion were estimated using a “bottom-up” methodology characterized by six steps. These steps are described below.

Step 1: Determine Energy Consumption by Fuel Type and Sector

The bottom-up methodology used by the United States for estimating CO₂ emissions from fossil fuel combustion is conceptually similar to the approach recommended by the Intergovernmental Panel on Climate Change (IPCC) for countries that intend to develop detailed, sectoral-based emission estimates (IPCC/UNEP/OECD/IEA 1997). Basic consumption data are presented in Columns 2 through 8 of Table A-1 through Table A-12, with totals by fuel type in Column 8 and totals by end-use sector in the last rows. Fuel consumption data for the bottom-up approach were obtained directly from the Energy Information Administration (EIA) of the U.S. Department of Energy. These data were first gathered in physical units, and then converted to their energy equivalents (see “Energy Conversions” in Annex Y). The EIA data were collected through a variety of consumption surveys at the point of delivery or use and qualified with survey data on fuel production, imports, exports, and stock changes. Individual data elements were supplied by a variety of sources within EIA. Most information was taken from published reports, although some data were drawn from unpublished energy studies and databases maintained by EIA.

Energy consumption data were aggregated by sector (i.e., residential, commercial, industrial, transportation, electricity generation, and U.S. territories), primary fuel type (e.g., coal, natural gas, and petroleum), and secondary fuel type (e.g., motor gasoline, distillate fuel, etc.). The 2001 total energy consumption across all sectors, including territories, and energy types was 82,933 trillion British thermal units (TBTu), as indicated in the last entry of Column 8 in Table A-1. This total includes fuel used for non-energy purposes and fuel consumed as international bunkers, both of which are deducted in later steps.

Electricity consumption information was allocated to each sector based on EIA’s distribution of electricity retail sales to ultimate customers (i.e., residential, commercial, industrial, and other). Because the “other” fuel use includes sales to both the commercial and transportation sectors, EIA’s limited transportation electricity use data were subtracted from “other” electricity use and also reported separately. This total was consequently combined with the commercial electricity data. Fuel consumption data for electricity generation data by nonutility power producers were categorized by the EIA under a “direct use” category. These data were combined with electricity fuel use by the industrial sector. Further information on these electricity end uses is described in EIA’s *Annual Energy Review 2001* (EIA 2002a). Additionally, electricity consumption for the U.S. territories was estimated as the sum of the net electricity consumption in Puerto Rico, Guam, U.S. Virgin Islands, American Samoa, and U.S. Pacific Islands (EIA 2002b).

There were a number of modifications made in this report that may cause consumption information herein to differ from figures given in the cited literature. These are 1) the reallocation of some coking coal, petroleum coke, and natural gas consumption for ammonia production to the Industrial Processes chapter, 2) corrections for synthetic natural gas production, 3) corrections for ethanol added to motor gasoline, and 4) corrections for biogas in natural gas.

First, portions of the fuel consumption data for three fuel categories—coking coal, petroleum coke, and natural gas—were reallocated to the Industrial Processes chapter, as these portions were actually consumed as raw material during non-energy related industrial processes. Coking coal, also called “coal coke,” is used as a raw material (specifically as a reducing agent) in the blast furnace process to produce iron and steel, and therefore is not used as a fuel for this process. Similarly, petroleum coke is used in multiple processes as a raw material, and is thus not used as a fuel in those applications. The processes in which petroleum coke is used include 1) ferroalloy production, 2) aluminum production (for the production of carbon anodes and cathodes), and 3) titanium dioxide production (in the chloride process). Finally, natural gas consumption is used for the production of ammonia. Consumption of these fuels for non-energy purposes is presented in the Industrial Processes chapter, and is removed from the energy and non-energy consumption estimates within the Energy chapter.

Second, a portion of industrial coal accounted for in EIA combustion figures is actually used to make “synthetic natural gas” via coal gasification. The energy in this gas enters the natural gas stream, and is accounted for in natural gas consumption statistics. Because this energy is already accounted for as natural gas, it is deducted from industrial coal consumption to avoid double counting. This makes the figure for other industrial coal consumption in this report slightly lower than most EIA sources.

Third, ethanol has been added to the motor gasoline stream for several years, but prior to 1993 this addition was not captured in EIA motor gasoline statistics. Starting in 1993, ethanol was included in gasoline statistics. However, because ethanol is a biofuel, which is assumed to result in no net CO₂ emissions, the amount of ethanol added is subtracted from total gasoline consumption. Thus, motor gasoline consumption statistics given in this report may be slightly lower than in EIA sources.

Fourth, EIA natural gas consumption statistics include “biomass gas,” which is upgraded landfill methane that is sold to pipelines. However, because this gas is biogenic, the biomass gas total is deducted from natural gas consumption. The subtraction is done only from natural gas in the industrial sector, as opposed to all end-sectors, because the biogas amount is small. Due to this adjustment—and the ammonia adjustment mentioned previously—industrial natural gas consumption in this report is slightly lower than in EIA sources.

There are also three basic differences between the consumption figures presented in Table A-1 through Table A-12 and those recommended in the IPCC emission inventory methodology.

First, consumption data in the U.S. inventory are presented using higher heating values (HHV)¹ rather than the lower heating values (LHV)² reflected in the IPCC emission inventory methodology. This convention is followed because data obtained from EIA are based on HHV. Of note, however, is that EIA renewable energy statistics are often published using LHV. The difference between the two conventions relates to the treatment of the heat energy that is consumed in the process of evaporating the water contained in the fuel. The simplified convention used by the International Energy Agency for converting from HHV to LHV is to multiply the energy content by 0.95 for petroleum and coal and by 0.9 for natural gas.

Second, while EIA's energy use data for the United States includes only the 50 U.S. states and the District of Columbia, the data reported to the Framework Convention on Climate Change are to include energy consumption within territories. Therefore, consumption estimates for U.S. territories were added to domestic consumption of fossil fuels. Energy consumption data from U.S. territories are presented in Column 7 of Table A-1 through Table A-12. It is reported separately from domestic sectoral consumption, because it is collected separately by EIA with no sectoral disaggregation.

Third, the domestic sectoral consumption data in Table A-1 through Table A-12 include bunker fuels used for international transport activities and non-energy uses of fossil fuels. The IPCC requires countries to estimate emissions from international bunker fuels separately and exclude these emissions from national totals, so international bunker fuel emissions have been estimated in Table A-13 and deducted from national estimates (see Step 4). Similarly, fossil fuels used to produce non-energy products that store carbon rather than release it to the atmosphere are provided in Table A-14 and deducted from national emission estimates (see Step 3). The final fate of these fossil fuel based products is dealt with under the waste combustion source category in cases where the products are combusted through waste management practices.

Step 2: Determine the Carbon Content of All Fuels

The carbon content of combusted fossil fuels was estimated by multiplying energy consumption (Columns 2 through 8 of Table A-1 through Table A-12) by fuel-specific carbon content coefficients (see Table A-15 and Table A-16) that reflect the amount of carbon per unit of energy in each fuel. The resulting carbon contents are sometimes referred to as potential emissions, or the maximum amount of carbon that could potentially be released to the atmosphere if all carbon in the fuels were oxidized. The carbon content coefficients used in the U.S. inventory were derived by EIA from detailed fuel information and are similar to the carbon content coefficients contained in the IPCC's default methodology (IPCC/UNEP/OECD/IEA 1997), with modifications reflecting fuel qualities specific to the United States.

¹ Also referred to as Gross Calorific Values (GCV).

² Also referred to as Net Calorific Values (NCV).

Step 3: Adjust for the amount of Carbon Stored in Products

Depending on the end-use, non-energy uses of fossil fuels can result in long term storage of some or all of the carbon contained in the fuel. For example, asphalt made from petroleum can sequester up to 100 percent of the carbon contained in the petroleum feedstock for extended periods of time. Other non-energy fossil fuel products, such as lubricants or plastics also store carbon, but can lose or emit some of this carbon when they are used and/or burned as waste.³

The amount of carbon in non-energy fossil fuel products was based upon data that addressed the fraction of carbon that remains in products after they are manufactured, with all non-energy use attributed to the industrial, transportation, and territories end-use sectors. This non-energy consumption is presented in Table A-14. These data were then multiplied by fuel-specific carbon content coefficients (Table A-15 and Table A-16) to obtain the carbon content of the fuel, or the maximum amount of carbon that could remain in non-energy products (Column 5 of Table A-14). This carbon content was then multiplied by the fraction of carbon assumed to actually have remained in products (Column 6 of Table A-14), resulting in the final estimates by sector and fuel type, which are presented in Columns 7 and 8 of Table A-14. A detailed discussion of carbon stored in products is provided in the Energy chapter and in Annex C.

Step 4: Subtract Carbon in International Bunker Fuels

Emissions from international transport activities, or international bunker fuel consumption, are not included in national totals, as required by the IPCC (IPCC/UNEP/OECD/IEA 1997). There is currently disagreement internationally as to how these emissions should be allocated, and until this issue is resolved, countries are asked to report them separately. EIA energy statistics, however, include these bunker fuels—jet fuel for aircraft, and distillate fuel oil and residual fuel oil for marine shipping—as part of fuel consumption by the transportation end-use sector. To compensate for this inclusion, international bunker fuel emissions⁴ were calculated separately (see Table A-13) and the carbon content of these fuels was subtracted from the transportation end-use sector. International bunker fuel emissions from military activities were developed using data provided by the Department of Defense as described in the International Bunker Fuels section of the Energy chapter and in Annex J. The calculations of international bunker fuel emissions followed the same procedures used for other fuel emissions (i.e., estimation of consumption, determination of carbon content, and adjustment for the fraction of carbon not oxidized).

Step 5: Account for Carbon that Does Not Oxidize During Combustion

Because combustion processes are not 100 percent efficient, some of the carbon contained in fuels is not emitted in a gaseous form to the atmosphere. Rather, it remains behind as soot, particulate matter and ash. The estimated fraction of carbon not oxidized in U.S. energy conversion processes due to inefficiencies during combustion ranges from 0.5 percent for natural gas to 1 percent for petroleum and coal. Except for coal these assumptions are consistent with the default values recommended by the IPCC (IPCC/UNEP/OECD/IEA 1997). In the United States, unoxidized carbon from coal combustion was estimated to be no more than one percent (Bechtel 1993).

Table A-15 presents fractions oxidized by fuel type, which are multiplied by the net carbon content of the combusted energy to give final emissions estimates.

Of the fraction of carbon that is oxidized (e.g., 99 to 99.5 percent), the vast majority is emitted in its fully oxidized form as carbon dioxide (CO₂). A much smaller portion of this “oxidized” carbon is also emitted as carbon monoxide (CO), methane (CH₄), and non-methane volatile organic compounds (NMVOCs). When in the

³ See Waste Combustion section of the Energy chapter for a discussion of emissions from the combustion of plastics in the municipal solid waste stream.

⁴ Refer to the International Bunker Fuels section of the Energy chapter for a description of the methodology for distinguishing between bunker and non-bunker fuel consumption.

atmosphere, though, these partially oxidized or unoxidized carbon compounds are generally oxidized to CO₂ through atmospheric processes (e.g., reaction with hydroxyl (OH)).⁵

Step 6: Summarize Emission Estimates

Actual CO₂ emissions in the United States were summarized by major fuel (i.e., coal, petroleum, natural gas, geothermal) and consuming sector (i.e., residential, commercial, industrial, transportation, electricity generation, and U.S. territories). Adjustments for international bunker fuels and carbon in non-energy products were made. Emission estimates are expressed in teragrams of carbon dioxide equivalents (Tg CO₂ Eq.).

To determine total emissions by final end-use sector, emissions from electricity generation were distributed to each end-use sector according to its share of aggregate electricity consumption (see Table A-17). This pro-rated approach to allocating emissions from electricity generation may overestimate or underestimate emissions for particular sectors due to differences in the average carbon content of fuel mixes burned to generate electricity.

⁵ See Indirect CO₂ from CH₄ Oxidation section in Energy chapter for a discussion of proper accounting of carbon from hydrocarbon and CO emissions.

Table A-1: 2001 Energy Consumption Data and CO₂ Emissions from Fossil Fuel Combustion by Fuel Type

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Fuel Type	Consumption (Tbtu) ^a							Emissions ^b (Tg CO ₂ Eq.) including Adjustments ^c and Fraction Oxidized						
	Res.	Comm.	Ind.	Trans.	Elec.	Terr.	Total	Res.	Comm.	Ind.	Trans.	Elec.	Terr.	Total
Total Coal	12.0	91.0	1,367.2	NE	19,689.0	9.8	21,169.0	1.1	8.6	126.3	NE	1,856.8	0.9	1,993.8
Residential Coal	12.0						12.0	1.1						1.1
Commercial Coal		91.0					91.0		8.6					8.6
Industrial Coking Coal			14.3				14.3			(0.4)				(0.4)
Industrial Other Coal			1,309.9				1,309.9			122.4				122.4
Coke Imports			43.0				43.0			4.3				4.3
Transportation Coal				NE			NE							NE
Utility Coal					19,689.0		19,689.0					1,856.8		1,856.8
U.S. Territory Coal (bit)						9.8	9.8						0.9	0.9
Natural Gas	4,940.0	3,331.0	8,634.3	642.0	5,397.0	22.8	22,967.2	260.8	175.8	445.5	33.9	284.9	1.2	1,202.1
Total Petroleum	1,472.5	717.9	8,518.3	26,017.7	1,280.0	743.5	38,750.0	101.4	51.4	365.8	1,747.0	100.7	52.3	2,418.6
Asphalt & Road Oil			1,257.6				1,257.6							
Aviation Gasoline				34.9			34.9				2.4			2.4
Distillate Fuel Oil	867.4	470.9	1,150.3	5,442.3	179.7	101.6	8,212.1	62.8	34.1	82.9	388.9	13.0	7.4	589.0
Jet Fuel				3,425.9		65.4	3,491.3				181.5		4.6	186.1
Kerosene	110.6	26.8	12.8			4.0	154.2	7.9	1.9	0.9			0.3	11.0
LPG	494.6	87.3	2,090.2	12.5		9.8	2,694.4	30.7	5.4	68.1	0.8		0.6	105.6
Lubricants			174.3	179.8		1.5	355.6			11.6	12.1		0.1	23.8
Motor Gasoline		46.7	154.3	16,086.1		174.1	16,461.2		3.3	10.8	1,129.3		12.2	1,155.6
Residual Fuel		86.3	226.7	836.0	990.1	129.3	2,268.4		6.7	15.5	32.0	76.5	10.1	140.8
Other Petroleum						257.8	257.8						17.0	17.0
AvGas Blend Components			5.6				5.6			0.4				0.4
Crude Oil														
MoGas Blend Components														
Misc. Products			114.6				114.6			(0.8)				(0.8)
Naphtha (<401 deg. F)			453.1				453.1			10.6				10.6
Other Oil (>401 deg. F)			608.0				608.0			15.6				15.6
Pentanes Plus			241.5				241.5			6.6				6.6
Petroleum Coke			647.1		110.2		757.3			59.7		11.1		70.8
Still Gas			1,346.1				1,346.1			84.0				84.0
Special Naphtha			72.0				72.0			5.2				5.2
Unfinished Oils			(69.2)				(69.2)			(5.1)				(5.1)
Waxes			33.4				33.4			(0.2)				(0.2)
Geothermal					47.1		47.1					0.4		0.4
TOTAL (All Fuels)	6,424.5	4,139.9	18,519.8	26,659.7	26,413.1	776.2	82,933.3	363.3	235.9	937.7	1,780.9	2,242.8	54.4	5,614.9

^a Expressed as gross calorific values (i.e., higher heating values).

^b Consumption and/or emissions of select fuels are shown as negative due to differences in EIA energy balancing accounting. These are designated with parentheses.

^c Adjustments include: international bunker fuel consumption (see Table A-13) and carbon in non-energy products (see Table A-14).

+ Absolute value does not exceed 0.05 Tg CO₂ Eq.

NE (Not Estimated)

Table A-2: 2000 Energy Consumption Data and CO₂ Emissions from Fossil Fuel Combustion by Fuel Type

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Fuel Type	Consumption (TBtu) ^a							Emissions ^b (Tg CO ₂ Eq.) including Adjustments ^c and Fraction Oxidized						
	Res.	Comm.	Ind.	Trans.	Elec.	Terr.	Total	Res.	Comm.	Ind.	Trans.	Elec.	Terr.	Total
Total Coal	12.0	91.0	1,447.4	NE	20,220.0	9.8	21,780.2	1.1	8.6	134.0	NE	1,906.9	0.9	2,051.5
Residential Coal	12.0						12.0	1.1						1.1
Commercial Coal		91.0					91.0		8.6					8.6
Industrial Coking Coal			14.8				14.8			(0.4)				(0.4)
Industrial Other Coal			1,355.6				1,355.6			126.7				126.7
Coke Imports			77.0				77.0			7.8				7.8
Transportation Coal				NE			NE							NE
Utility Coal					20,220.0		20,220.0					1,906.9		1,906.9
U.S. Territory Coal (bit)						9.8	9.8						0.9	0.9
Natural Gas	5,121.0	3,301.3	9,282.2	672.0	5,316.0	11.7	23,704.2	270.3	174.3	478.9	35.5	280.6	0.6	1,240.3
Total Petroleum	1,493.1	718.6	8,899.9	25,764.1	1,144.3	722.6	38,742.6	102.4	51.4	378.2	1,727.3	89.9	50.8	2,400.0
Asphalt & Road Oil			1,275.7				1,275.7							
Aviation Gasoline				36.3			36.3				2.5			2.5
Distillate Fuel Oil	847.5	460.1	1,123.7	5,317.7	174.8	99.1	8,022.9	61.4	33.3	81.0	378.9	12.7	7.2	574.4
Jet Fuel				3,580.4		64.5	3,644.9				192.8		4.5	197.4
Kerosene	103.0	25.0	11.9			3.9	143.7	7.4	1.8	0.9			0.3	10.3
LPG	542.6	95.7	2,293.1	13.7		9.5	2,954.6	33.6	5.9	76.4	0.8		0.6	117.4
Lubricants			189.9	179.4		1.4	370.7			12.7	12.0		0.1	24.7
Motor Gasoline		46.2	152.7	15,749.1		169.2	16,117.2		3.2	10.7	1,105.7		11.9	1,131.5
Residual Fuel		91.6	240.6	887.5	870.8	125.8	2,216.4		7.1	16.6	34.6	67.3	9.8	135.4
Other Petroleum						249.2	249.2						16.5	16.5
AvGas Blend Components			3.8				3.8			0.3				0.3
Crude Oil														
MoGas Blend Components														
Misc. Products			119.3				119.3			+				+
Naphtha (<401 deg. F)			613.9				613.9			17.1				17.1
Other Oil (>401 deg. F)			722.6				722.6			22.0				22.0
Pentanes Plus			343.4				343.4			10.8				10.8
Petroleum Coke			631.3		98.6		729.9			60.9		10.0		70.9
Still Gas			1,449.0				1,449.0			91.5				91.5
Special Naphtha			97.4				97.4			7.0				7.0
Unfinished Oils			(401.4)				(401.4)			(29.5)				(29.5)
Waxes			33.1				33.1			+				+
Geothermal					48.1		48.1					0.4		0.4
TOTAL (All Fuels)	6,626.1	4,110.9	19,629.5	26,436.1	26,728.4	744.2	84,275.2	373.9	234.3	991.1	1,762.7	2,277.8	52.3	5,692.2

^a Expressed as gross calorific values (i.e., higher heating values).^b Consumption and/or emissions of select fuels are shown as negative due to differences in EIA energy balancing accounting. These are designated with parentheses.^c Adjustments include: international bunker fuel consumption (see Table A-13) and carbon in non-energy products (see Table A-14).+ Absolute value does not exceed 0.05 Tg CO₂ Eq.

NE (Not Estimated)

Table A-3: 1999 Energy Consumption Data and CO₂ Emissions from Fossil Fuel Combustion by Fuel Type

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Fuel Type	Consumption (Tbtu) ^a							Emissions ^b (Tg CO ₂ Eq.) including Adjustments ^c and Fraction Oxidized						
	Res.	Comm.	Ind.	Trans.	Elec.	Terr.	Total	Res.	Comm.	Ind.	Trans.	Elec.	Terr.	Total
Total Coal	14.0	103.0	1,419.3	NE	19,279.0	9.8	20,825.1	1.3	9.7	131.7	NE	1,817.5	0.9	1,961.1
Residential Coal	14.0						14.0	1.3						1.3
Commercial Coal		103.0					103.0		9.7					9.7
Industrial Coking Coal			6.3				6.3			(1.2)				(1.2)
Industrial Other Coal			1,342.9				1,342.9			125.8				125.8
Coke Imports			70.0				70.0			7.1				7.1
Transportation Coal				NE			NE							NE
Utility Coal					19,279.0		19,279.0					1,817.5		1,817.5
U.S. Territory Coal (bit)						9.8	9.8						0.9	0.9
Natural Gas	4,858.0	3,129.9	9,040.6	674.0	4,926.0		22,628.5	256.5	165.2	466.4	35.6	260.1		1,183.8
Total Petroleum	1,452.1	654.8	8,961.1	25,178.1	1,211.4	700.4	38,157.8	99.5	46.7	375.0	1,677.5	95.6	49.3	2,343.6
Asphalt & Road Oil			1,324.4				1,324.4							
Aviation Gasoline				39.2			39.2				2.7			2.7
Distillate Fuel Oil	807.2	414.5	1,063.5	5,157.5	140.1	96.4	7,679.3	58.5	30.0	76.6	365.3	10.1	7.0	547.5
Jet Fuel				3,461.8		63.7	3,525.5				184.1		4.5	188.6
Kerosene	111.2	26.9	12.8			3.7	154.7	8.0	1.9	0.9			0.3	11.1
LPG	533.8	94.2	2,255.7	13.4		9.3	2,906.3	33.1	5.8	76.0	0.8		0.6	116.4
Lubricants			192.8	182.1		1.4	376.3			12.9	12.1		0.1	25.1
Motor Gasoline		45.8	151.5	15,658.6		164.0	16,019.9		3.2	10.6	1,098.7		11.5	1,124.1
Residual Fuel		73.3	207.5	665.4	958.7	122.1	2,027.0		5.7	14.0	13.7	74.1	9.5	117.0
Other Petroleum						239.9	239.9						15.8	15.8
AvGas Blend Components			6.4				6.4			0.4				0.4
Crude Oil														
MoGas Blend Components														
Misc. Products			111.9				111.9			+				+
Naphtha (<401 deg. F)			502.0				502.0			14.0				14.0
Other Oil (>401 deg. F)			811.0				811.0			24.7				24.7
Pentanes Plus			364.9				364.9			11.5				11.5
Petroleum Coke			624.9		112.5		737.4			53.4		11.4		64.8
Still Gas			1,436.9				1,436.9			90.5				90.5
Special Naphtha			145.4				145.4			10.5				10.5
Unfinished Oils			(287.9)				(287.9)			(21.1)				(21.1)
Waxes			37.4				37.4			+				+
Geothermal					50.5		50.5					0.4		0.4
TOTAL (All Fuels)	6,324.1	3,887.7	19,421.1	25,852.1	25,466.8	710.2	81,662.0	357.3	221.7	973.2	1,713.0	2,173.5	50.2	5,488.8

^a Expressed as gross calorific values (i.e., higher heating values).

^b Consumption and/or emissions of select fuels are shown as negative due to differences in EIA energy balancing accounting. These are designated with parentheses.

^c Adjustments include: international bunker fuel consumption (see Table A-13) and carbon in non-energy products (see Table A-14).

+ Absolute value does not exceed 0.05 Tg CO₂ Eq.

NE (Not Estimated)

Table A-4: 1998 Energy Consumption Data and CO₂ Emissions from Fossil Fuel Combustion by Fuel Type

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Fuel Type	Consumption (Tbtu) ^a							Emissions ^b (Tg CO ₂ Eq.) including Adjustments ^c and Fraction Oxidized						
	Res.	Comm.	Ind.	Trans.	Elec.	Terr.	Total	Res.	Comm.	Ind.	Trans.	Elec.	Terr.	Total
Total Coal	13.0	92.0	1,483.9	NE	19,216.0	9.8	20,814.7	1.2	8.7	137.8	NE	1,808.7	0.9	1,957.3
Residential Coal	13.0						13.0	1.2						1.2
Commercial Coal		92.0					92.0		8.7					8.7
Industrial Coking Coal			15.4				15.4			(0.3)				(0.3)
Industrial Other Coal			1,388.5				1,388.5			130.0				130.0
Coke Imports			80.0				80.0			8.1				8.1
Transportation Coal				NE			NE							NE
Utility Coal					19,216.0		19,216.0					1,808.7		1,808.7
U.S. Territory Coal (bit)						9.8	9.8						0.9	0.9
Natural Gas	4,669.0	3,098.0	9,410.5	665.0	4,698.0		22,540.5	246.5	163.5	484.1	35.1	248.0		1,177.2
Total Petroleum	1,321.8	658.1	8,772.6	24,457.6	1,306.2	668.2	37,184.5	91.1	47.2	378.2	1,618.8	103.2	47.0	2,285.6
Asphalt & Road Oil			1,262.6				1,262.6							
Aviation Gasoline				35.5			35.5				2.4			2.4
Distillate Fuel Oil	779.9	421.5	1,101.2	4,909.7	135.7	116.5	7,464.4	56.5	30.5	79.3	344.1	9.8	8.4	528.6
Jet Fuel				3,356.8		67.9	3,424.7				180.6		4.8	185.4
Kerosene	108.3	31.2	22.1			6.3	167.8	7.8	2.2	1.6			0.4	12.0
LPG	433.6	76.5	2,048.3	16.6		7.2	2,582.2	26.9	4.7	70.8	1.0		0.4	103.9
Lubricants			190.8	180.2		1.3	372.3			12.7	12.0		0.1	24.8
Motor Gasoline		43.8	199.4	15,285.1		170.0	15,698.3		3.1	14.0	1,072.5		11.9	1,101.5
Residual Fuel		85.2	229.8	673.7	1,047.0	91.9	2,127.6		6.6	15.7	6.2	80.9	7.2	116.6
Other Petroleum						207.1	207.1						13.7	13.7
AvGas Blend Components			4.0				4.0			0.3				0.3
Crude Oil														
MoGas Blend Components														
Misc. Products			119.0				119.0			+				+
Naphtha (<401 deg. F)			584.0				584.0			16.4				16.4
Other Oil (>401 deg. F)			818.7				818.7			25.1				25.1
Pentanes Plus			294.0				294.0			9.3				9.3
Petroleum Coke			625.9		123.6		749.4			57.0		12.5		69.5
Still Gas			1,437.3				1,437.3			91.4				91.4
Special Naphtha			107.3				107.3			7.7				7.7
Unfinished Oils			(313.9)				(313.9)			(23.1)				(23.1)
Waxes			42.4				42.4			+				+
Geothermal					50.5		50.5					0.4		0.4
TOTAL (All Fuels)	6,003.8	3,848.1	19,667.0	25,122.6	25,270.7	678.0	80,590.3	338.8	219.5	1,000.1	1,653.9	2,160.3	47.9	5,420.5

^a Expressed as gross calorific values (i.e., higher heating values).

^b Consumption and/or emissions of select fuels are shown as negative due to differences in EIA energy balancing accounting. These are designated with parentheses.

^c Adjustments include: international bunker fuel consumption (see Table A-13) and carbon in non-energy products (see Table A-14).

+ Absolute value does not exceed 0.05 Tg CO₂ Eq.

NE (Not Estimated)

Table A-5: 1997 Energy Consumption Data and CO₂ Emissions from Fossil Fuel Combustion by Fuel Type

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Fuel Type	Consumption (Tbtu) ^a							Emissions ^b (Tg CO ₂ Eq.) including Adjustments ^c and Fraction Oxidized						
	Res.	Comm.	Ind.	Trans.	Elec.	Terr.	Total	Res.	Comm.	Ind.	Trans.	Elec.	Terr.	Total
Total Coal	16.0	129.0	1,582.3	NE	18,905.0	10.4	20,642.7	1.5	12.1	146.4	NE	1,778.1	0.9	1,939.1
Residential Coal	16.0						16.0	1.5						1.5
Commercial Coal		129.0					129.0		12.1					12.1
Industrial Coking Coal			46.3				46.3			2.4				2.4
Industrial Other Coal			1,479.0				1,479.0			138.3				138.3
Coke Imports			57.0				57.0			5.8				5.8
Transportation Coal				NE			NE							NE
Utility Coal					18,905.0		18,905.0					1,778.1		1,778.1
U.S. Territory Coal (bit)						10.4	10.4						0.9	0.9
Natural Gas	5,118.0	3,302.0	9,592.7	779.0	4,146.0		22,937.7	270.2	174.3	495.8	41.1	218.9		1,200.3
Total Petroleum	1,448.0	703.4	9,103.7	23,930.2	926.8	598.4	36,710.5	100.0	50.6	408.6	1,585.8	73.5	41.8	2,260.3
Asphalt & Road Oil			1,223.6				1,223.6							
Aviation Gasoline				39.7			39.7				2.7			2.7
Distillate Fuel Oil	894.4	443.5	1,116.9	4,728.4	110.6	107.1	7,400.9	64.8	32.1	80.5	333.3	8.0	7.8	526.5
Jet Fuel				3,308.2		64.0	3,372.1				176.2		4.5	180.7
Kerosene	92.9	24.6	18.8			4.0	140.3	6.6	1.8	1.3			0.3	10.0
LPG	460.8	81.3	2,134.1	13.4		7.9	2,697.5	28.6	5.0	74.2	0.8		0.5	109.1
Lubricants			182.3	172.1		2.5	356.9			12.2	11.5		0.2	23.8
Motor Gasoline		42.7	211.9	14,956.7		143.6	15,354.9		3.0	14.9	1,050.6		10.1	1,078.5
Residual Fuel		111.2	290.6	711.7	714.6	60.0	1,888.2		8.7	20.5	10.6	55.2	4.7	99.8
Other Petroleum						209.4	209.4						13.9	13.9
AvGas Blend Components			9.1				9.1			0.6				0.6
Crude Oil			4.6				4.6			0.3				0.3
MoGas Blend Components														
Misc. Products			97.8				97.8			+				+
Naphtha (<401 deg. F)			536.4				536.4			15.3				15.3
Other Oil (>401 deg. F)			861.3				861.3			26.7				26.7
Pentanes Plus			328.9				328.9			10.5				10.5
Petroleum Coke			627.1		101.6		728.6			61.9		10.3		72.1
Still Gas			1,447.2				1,447.2			91.9				91.9
Special Naphtha			72.3				72.3			5.2				5.2
Unfinished Oils			(102.9)				(102.9)			(7.6)				(7.6)
Waxes			43.7				43.7			+				+
Geothermal					50.5		50.5					0.4		0.4
TOTAL (All Fuels)	6,582.0	4,134.4	20,278.7	24,709.2	24,028.3	608.8	80,341.4	371.7	237.1	1,050.8	1,626.9	2,070.8	42.8	5,400.0

^a Expressed as gross calorific values (i.e., higher heating values).

^b Consumption and/or emissions of select fuels are shown as negative due to differences in EIA energy balancing accounting. These are designated with parentheses.

^c Adjustments include: international bunker fuel consumption (see Table A-13) and carbon in non-energy products (see Table A-14).

+ Absolute value does not exceed 0.05 Tg CO₂ Eq.

NE (Not Estimated)

Table A-6: 1996 Energy Consumption Data and CO₂ Emissions from Fossil Fuel Combustion by Fuel Type

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Fuel Type	Consumption (Tbtu) ^a							Emissions ^b (Tg CO ₂ Eq.) including Adjustments ^c and Fraction Oxidized						
	Res.	Comm.	Ind.	Trans.	Elec.	Terr.	Total	Res.	Comm.	Ind.	Trans.	Elec.	Terr.	Total
Total Coal	17.0	122.0	1,573.3	NE	18,429.0	10.3	20,151.6	1.6	11.5	145.3	NE	1,734.0	0.9	1,893.4
Residential Coal	17.0						17.0	1.6						1.6
Commercial Coal		122.0					122.0		11.5					11.5
Industrial Coking Coal			59.7				59.7			3.5				3.5
Industrial Other Coal			1,478.6				1,478.6			138.2				138.2
Coke Imports			35.0				35.0			3.5				3.5
Transportation Coal				NE			NE							NE
Utility Coal					18,429.0		18,429.0					1,734.0		1,734.0
U.S. Territory Coal (bit)						10.3	10.3						0.9	0.9
Natural Gas	5,383.0	3,244.0	9,561.5	736.0	3,883.0		22,807.5	284.2	171.3	494.6	38.9	205.0		1,193.9
Total Petroleum	1,488.6	742.5	8,853.1	23,700.7	817.4	560.0	36,162.1	102.8	53.6	399.6	1,578.5	64.5	39.1	2,238.2
Asphalt & Road Oil			1,175.9				1,175.9							
Aviation Gasoline				37.4			37.4				2.6			2.6
Distillate Fuel Oil	926.6	474.2	1,113.6	4,541.5	109.4	106.3	7,271.5	67.1	34.3	80.3	320.6	7.9	7.7	518.0
Jet Fuel				3,274.2		66.1	3,340.3				177.6		4.6	182.2
Kerosene	88.8	21.0	18.3			3.0	131.1	6.4	1.5	1.3			0.2	9.4
LPG	473.2	83.5	2,088.9	14.7		7.3	2,667.7	29.3	5.2	71.1	0.9		0.5	107.0
Lubricants			172.5	163.0		0.8	336.3			11.5	10.9		0.1	22.4
Motor Gasoline		26.5	199.9	14,818.6		118.6	15,163.7		1.9	14.0	1,041.4		8.3	1,065.7
Residual Fuel		137.2	335.2	851.3	628.4	57.2	2,009.3		10.7	24.1	24.6	48.6	4.5	112.4
Other Petroleum						200.7	200.7						13.3	13.3
AvGas Blend Components			6.9				6.9			0.5				0.5
Crude Oil			13.7				13.7			1.0				1.0
MoGas Blend Components														
Misc. Products			89.0				89.0			+				+
Naphtha (<401 deg. F)			478.9				478.9			13.3				13.3
Other Oil (>401 deg. F)			729.1				729.1			22.2				22.2
Pentanes Plus			354.7				354.7			11.4				11.4
Petroleum Coke			630.1		79.6		709.7			60.5		8.0		68.5
Still Gas			1,435.9				1,435.9			91.3				91.3
Special Naphtha			74.5				74.5			5.4				5.4
Unfinished Oils			(112.7)				(112.7)			(8.3)				(8.3)
Waxes			48.6				48.6			+				+
Geothermal					50.2		50.2					0.4		0.4
TOTAL (All Fuels)	6,888.6	4,108.5	19,987.9	24,436.7	23,179.5	570.3	79,171.4	388.6	236.4	1,039.5	1,617.4	2,003.9	40.1	5,325.8

^a Expressed as gross calorific values (i.e., higher heating values).

^b Consumption and/or emissions of select fuels are shown as negative due to differences in EIA energy balancing accounting. These are designated with parentheses.

^c Adjustments include: international bunker fuel consumption (see Table A-13) and carbon in non-energy products (see Table A-14).

+ Absolute value does not exceed 0.05 Tg CO₂ Eq.

NE (Not Estimated)

Table A-7: 1995 Energy Consumption Data and CO₂ Emissions from Fossil Fuel Combustion by Fuel Type

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Fuel Type	Consumption (Tbtu) ^a							Emissions ^b (Tg CO ₂ Eq.) including Adjustments ^c and Fraction Oxidized						
	Res.	Comm.	Ind.	Trans.	Elec.	Terr.	Total	Res.	Comm.	Ind.	Trans.	Elec.	Terr.	Total
Total Coal	17.0	117.0	1,606.7	NE	17,466.0	10.2	19,216.9	1.6	11.1	148.8	NE	1,643.4	0.9	1,805.8
Residential Coal	17.0						17.0	1.6						1.6
Commercial Coal		117.0					117.0		11.1					11.1
Industrial Coking Coal			50.6				50.6			2.6				2.6
Industrial Other Coal			1,495.1				1,495.1			140.0				140.0
Coke Imports			61.0				61.0			6.2				6.2
Transportation Coal				NE			NE							NE
Utility Coal					17,466.0		17,466.0					1,643.4		1,643.4
U.S. Territory Coal (bit)						10.2	10.2						0.9	0.9
Natural Gas	4,981.0	3,113.0	9,261.0	723.0	4,325.0		22,403.0	263.0	164.3	478.8	38.2	228.3		1,172.6
Total Petroleum	1,356.3	710.2	8,455.9	23,114.8	754.6	605.5	34,997.3	94.0	51.4	374.9	1,539.6	59.7	43.1	2,162.7
Asphalt & Road Oil			1,178.2				1,178.2							
Aviation Gasoline				39.6			39.6				2.7			2.7
Distillate Fuel Oil	877.8	457.2	1,060.3	4,306.4	108.1	125.6	6,935.2	63.6	33.1	76.5	302.8	7.8	9.1	492.8
Jet Fuel				3,132.2		75.5	3,207.7				168.7		5.3	174.0
Kerosene	74.3	22.1	15.4			3.6	115.4	5.3	1.6	1.1			0.3	8.3
LPG	404.2	71.3	2,019.4	16.7		5.6	2,517.3	25.1	4.4	69.2	1.0		0.3	100.1
Lubricants			177.8	167.9		2.0	347.7			11.9	11.2		0.1	23.2
Motor Gasoline		18.1	200.1	14,541.5		148.1	14,907.9		1.3	14.1	1,023.0		10.4	1,048.8
Residual Fuel		141.5	336.7	910.5	566.0	111.9	2,066.6		11.0	24.2	30.2	43.7	8.7	118.0
Other Petroleum						133.2	133.2						8.8	8.8
AvGas Blend Components			5.3				5.3			0.4				0.4
Crude Oil			14.5				14.5			1.1				1.1
MoGas Blend Components														
Misc. Products			97.0				97.0			+				+
Naphtha (<401 deg. F)			372.6				372.6			10.4				10.4
Other Oil (>401 deg. F)			800.3				800.3			24.4				24.4
Pentanes Plus			337.6				337.6			10.8				10.8
Petroleum Coke			633.6		80.6		714.1			61.5		8.1		69.6
Still Gas			1,416.2				1,416.2			88.0				88.0
Special Naphtha			70.8				70.8			5.1				5.1
Unfinished Oils			(320.6)				(320.6)			(23.5)				(23.5)
Waxes			40.6				40.6			+				+
Geothermal					48.8		48.8					0.4		0.4
TOTAL (All Fuels)	6,354.3	3,940.2	19,323.6	23,837.8	22,594.4	615.7	76,666.0	358.5	226.9	1,002.6	1,577.8	1,931.8	44.0	5,141.5

^a Expressed as gross calorific values (i.e., higher heating values).

^b Consumption and/or emissions of select fuels are shown as negative due to differences in EIA energy balancing accounting. These are designated with parentheses.

^c Adjustments include: international bunker fuel consumption (see Table A-13) and carbon in non-energy products (see Table A-14).

+ Absolute value does not exceed 0.05 Tg CO₂ Eq.

NE (Not Estimated)

Table A-8: 1994 Energy Consumption Data and CO₂ Emissions from Fossil Fuel Combustion by Fuel Type

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Fuel Type	Consumption (Tbtu) ^a							Emissions ^b (Tg CO ₂ Eq.) including Adjustments ^c and Fraction Oxidized						
	Res.	Comm.	Ind.	Trans.	Elec.	Terr.	Total	Res.	Comm.	Ind.	Trans.	Elec.	Terr.	Total
Total Coal	21.0	118.0	1,640.5	NE	17,261.0	10.0	19,050.5	2.0	11.2	151.9	NE	1,621.6	0.9	1,787.6
Residential Coal	21.0						21.0	2.0						2.0
Commercial Coal		118.0					118.0		11.2					11.2
Industrial Coking Coal			37.0				37.0			1.5				1.5
Industrial Other Coal			1,545.5				1,545.5			144.6				144.6
Coke Imports			58.0				58.0			5.9				5.9
Transportation Coal				NE			NE							NE
Utility Coal					17,261.0		17,261.0					1,621.6		1,621.6
U.S. Territory Coal (bit)						10.0	10.0						0.9	0.9
Natural Gas	4,988.0	2,979.0	8,780.4	708.0	4,000.0		21,455.5	263.3	157.3	452.8	37.4	211.2		1,121.9
Total Petroleum	1,333.0	747.0	8,696.8	22,641.3	1,058.8	561.8	35,038.7	92.4	54.3	393.0	1,512.5	82.9	40.8	2,175.8
Asphalt & Road Oil			1,172.9				1,172.9							
Aviation Gasoline				38.1			38.1				2.6			2.6
Distillate Fuel Oil	872.6	460.6	1,095.1	4,168.1	120.1	118.8	6,835.3	63.2	33.4	79.1	293.1	8.7	8.6	486.0
Jet Fuel				3,154.5		65.8	3,220.3				173.2		4.6	177.9
Kerosene	64.9	19.5	16.9			3.0	104.3	4.6	1.4	1.2			0.2	7.5
LPG	395.4	69.8	1,996.5	32.2		7.3	2,501.2	24.5	4.3	68.8	2.0		0.5	100.1
Lubricants			180.9	170.8		1.9	353.6			12.1	11.4		0.1	23.6
Motor Gasoline		25.2	192.4	14,194.9		148.0	14,560.6		1.8	13.6	1,002.2		10.5	1,028.0
Residual Fuel		171.9	418.9	882.6	869.0	164.1	2,506.5		13.4	30.7	27.9	67.2	12.8	152.0
Other Petroleum						53.0	53.0						3.5	3.5
AvGas Blend Components			6.1				6.1			0.4				0.4
Crude Oil			18.7				18.7			1.4				1.4
MoGas Blend Components														
Misc. Products			105.9				105.9			+				+
Naphtha (<401 deg. F)			398.4				398.4			11.0				11.0
Other Oil (>401 deg. F)			838.7				838.7			25.3				25.3
Pentanes Plus			338.7				338.7			12.5				12.5
Petroleum Coke			634.8		69.7		704.5			61.3		7.0		68.4
Still Gas			1,439.5				1,439.5			90.4				90.4
Special Naphtha			81.1				81.1			5.8				5.8
Unfinished Oils			(279.2)				(279.2)			(20.5)				(20.5)
Waxes			40.6				40.6			+				+
Geothermal					45.7		45.7					0.3		0.3
TOTAL (All Fuels)	6,342.0	3,844.0	19,117.7	23,349.4	22,365.5	571.8	75,590.4	357.7	222.7	997.7	1,549.8	1,916.0	41.7	5,085.6

^a Expressed as gross calorific values (i.e., higher heating values).

^b Consumption and/or emissions of select fuels are shown as negative due to differences in EIA energy balancing accounting. These are designated with parentheses.

^c Adjustments include: international bunker fuel consumption (see Table A-13) and carbon in non-energy products (see Table A-14).

+ Absolute value does not exceed 0.05 Tg CO₂ Eq.

NE (Not Estimated)

Table A-9: 1993 Energy Consumption Data and CO₂ Emissions from Fossil Fuel Combustion by Fuel Type

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Fuel Type	Consumption (Tbtu) ^a							Emissions ^b (Tg CO ₂ Eq.) including Adjustments ^c and Fraction Oxidized						
	Res.	Comm.	Ind.	Trans.	Elec.	Terr.	Total	Res.	Comm.	Ind.	Trans.	Elec.	Terr.	Total
Total Coal	24.0	119.0	1,608.2	NE	17,196.0	9.6	18,956.8	2.3	11.3	148.6	NE	1,614.8	0.9	1,777.9
Residential Coal	24.0						24.0	2.3						2.3
Commercial Coal		119.0					119.0		11.3					11.3
Industrial Coking Coal			38.3				38.3			1.5				1.5
Industrial Other Coal			1,542.9				1,542.9			144.3				144.3
Coke Imports			27.0				27.0			2.7				2.7
Transportation Coal				NE			NE							NE
Utility Coal					17,196.0		17,196.0					1,614.8		1,614.8
U.S. Territory Coal (bit)						9.6	9.6						0.9	0.9
Natural Gas	5,095.0	2,942.0	8,740.3	644.0	3,560.0		20,981.3	269.0	155.3	452.9	34.0	187.9		1,099.2
Total Petroleum	1,384.9	749.4	8,295.6	22,040.6	1,123.8	534.1	34,128.4	96.0	54.4	377.6	1,467.4	88.3	38.7	2,122.4
Asphalt & Road Oil			1,149.0				1,149.0							
Aviation Gasoline				38.4			38.4				2.6			2.6
Distillate Fuel Oil	910.7	462.7	1,090.3	3,908.8	86.5	104.9	6,564.0	66.0	33.5	78.7	272.5	6.3	7.6	464.5
Jet Fuel				3,028.0		62.1	3,090.1				165.4		4.4	169.8
Kerosene	75.6	14.0	13.1			3.8	106.5	5.4	1.0	0.9			0.3	7.6
LPG	398.6	70.3	1,794.4	19.0		4.9	2,287.2	24.7	4.4	63.3	1.2		0.3	93.8
Lubricants			173.1	163.5		3.3	339.8			11.5	10.9		0.2	22.7
Motor Gasoline		29.6	179.5	13,981.5		128.3	14,318.8		2.1	12.7	986.1		9.0	1,009.9
Residual Fuel		172.7	445.9	901.5	958.6	155.9	2,634.6		13.5	32.7	28.7	74.1	12.2	161.1
Other Petroleum						71.0	71.0						4.7	4.7
AvGas Blend Components			0.1				0.1			+				+
Crude Oil			21.1				21.1			1.6				1.6
MoGas Blend Components														
Misc. Products			94.7				94.7			+				+
Naphtha (<401 deg. F)			350.5				350.5			9.7				9.7
Other Oil (>401 deg. F)			843.9				843.9			25.5				25.5
Pentanes Plus			332.2				332.2			11.4				11.4
Petroleum Coke			629.3		78.6		707.9			61.7		8.0		69.6
Still Gas			1,429.8				1,429.8			89.4				89.4
Special Naphtha			104.6				104.6			7.5				7.5
Unfinished Oils			(395.9)				(395.9)			(29.1)				(29.1)
Waxes			40.0				40.0			+				+
Geothermal					52.9		52.9					0.4		0.4
TOTAL (All Fuels)	6,503.9	3,810.4	18,644.1	22,684.6	21,932.7	543.7	74,119.4	367.3	221.1	979.2	1,501.4	1,891.5	39.5	4,999.9

^a Expressed as gross calorific values (i.e., higher heating values).

^b Consumption and/or emissions of select fuels are shown as negative due to differences in EIA energy balancing accounting. These are designated with parentheses.

^c Adjustments include: international bunker fuel consumption (see Table A-13) and carbon in non-energy products (see Table A-14).

+ Absolute value does not exceed 0.05 Tg CO₂ Eq.

NE (Not Estimated)

Table A-10: 1992 Energy Consumption Data and CO₂ Emissions from Fossil Fuel Combustion by Fuel Type

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Fuel Type	Consumption (Tbtu) ^a							Emissions ^b (Tg CO ₂ Eq.) including Adjustments ^c and Fraction Oxidized						
	Res.	Comm.	Ind.	Trans.	Elec.	Terr.	Total	Res.	Comm.	Ind.	Trans.	Elec.	Terr.	Total
Total Coal	24.0	118.0	1,592.5	NE	16,466.0	8.8	18,209.3	2.3	11.3	147.0	NE	1,553.5	0.8	1,714.9
Residential Coal	24.0						24.0	2.3						2.3
Commercial Coal		118.0					118.0		11.3					11.3
Industrial Coking Coal			24.9				24.9			(0.5)				(0.5)
Industrial Other Coal			1,532.6				1,532.6			143.9				143.9
Coke Imports			35.0				35.0			3.5				3.5
Transportation Coal				NE			NE							NE
Utility Coal					16,466.0		16,466.0					1,553.5		1,553.5
U.S. Territory Coal (bit)						8.8	8.8						0.8	0.8
Natural Gas	4,835.0	2,890.0	8,583.3	608.0	3,534.0		20,450.3	255.2	152.6	445.3	32.1	186.6		1,071.7
Total Petroleum	1,310.8	810.5	8,436.6	21,780.9	990.7	507.5	33,837.0	90.9	58.9	391.7	1,439.8	77.3	36.7	2,095.3
Asphalt & Road Oil			1,102.2				1,102.2							
Aviation Gasoline				41.1			41.1				2.8			2.8
Distillate Fuel Oil	863.3	463.2	1,135.7	3,808.1	73.5	91.8	6,435.7	62.5	33.5	82.0	265.2	5.3	6.6	455.2
Jet Fuel				3,001.3		61.3	3,062.6				164.2		4.3	168.5
Kerosene	65.0	11.1	9.8			3.3	89.2	4.7	0.8	0.7			0.2	6.4
LPG	382.5	67.5	1,859.8	18.4		11.9	2,340.1	23.7	4.2	65.8	1.1		0.7	95.6
Lubricants			170.0	160.5		1.5	332.0			11.3	10.7		0.1	22.1
Motor Gasoline		79.6	194.2	13,681.5		122.1	14,077.5		5.6	13.7	964.5		8.6	992.4
Residual Fuel		189.1	386.9	1,070.0	872.2	154.6	2,672.7		14.8	27.9	31.2	67.4	12.1	153.3
Other Petroleum						61.2	61.2						4.0	4.0
AvGas Blend Components			0.2				0.2			+				+
Crude Oil			27.4				27.4			2.0				2.0
MoGas Blend Components			75.7				75.7			5.3				5.3
Misc. Products			100.1				100.1			+				+
Naphtha (<401 deg. F)			377.3				377.3			10.4				10.4
Other Oil (>401 deg. F)			815.0				815.0			24.6				24.6
Pentanes Plus			322.7				322.7			19.0				19.0
Petroleum Coke			624.8		45.0		669.9			56.0		4.5		60.6
Still Gas			1,447.8				1,447.8			91.5				91.5
Special Naphtha			104.6				104.6			7.5				7.5
Unfinished Oils			(355.0)				(355.0)			(26.1)				(26.1)
Waxes			37.3				37.3			+				+
Geothermal					57.3		57.3					0.4		0.4
TOTAL (All Fuels)	6,169.8	3,818.5	18,612.4	22,388.9	21,048.0	516.4	72,554.0	348.4	222.8	984.0	1,471.9	1,817.7	37.5	4,882.3

^a Expressed as gross calorific values (i.e., higher heating values).

^b Consumption and/or emissions of select fuels are shown as negative due to differences in EIA energy balancing accounting. These are designated with parentheses.

^c Adjustments include: international bunker fuel consumption (see Table A-13) and carbon in non-energy products (see Table A-14).

+ Absolute value does not exceed 0.05 Tg CO₂ Eq.

NE (Not Estimated)

Table A-11: 1991 Energy Consumption Data and CO₂ Emissions from Fossil Fuel Combustion by Fuel Type

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Fuel Type	Consumption (Tbtu) ^a							Emissions ^b (Tg CO ₂ Eq.) including Adjustments ^c and Fraction Oxidized						
	Res.	Comm.	Ind.	Trans.	Elec.	Terr.	Total	Res.	Comm.	Ind.	Trans.	Elec.	Terr.	Total
Total Coal	23.0	118.0	1,621.3	NE	16,250.0	7.7	18,020.1	2.2	11.3	151.1	NE	1,531.9	0.7	1,697.2
Residential Coal	23.0						23.0	2.2						2.2
Commercial Coal		118.0					118.0		11.3					11.3
Industrial Coking Coal			28.5				28.5			1.4				1.4
Industrial Other Coal			1,582.9				1,582.9			148.8				148.8
Coke Imports			10.0				10.0			1.0				1.0
Transportation Coal				NE			NE							NE
Utility Coal					16,250.0		16,250.0					1,531.9		1,531.9
U.S. Territory Coal (bit)						7.7	7.7						0.7	0.7
Natural Gas	4,697.0	2,813.0	8,247.2	620.0	3,399.0		19,776.2	248.0	148.5	426.4	32.7	179.4		1,035.0
Total Petroleum	1,292.7	859.1	7,973.1	21,434.0	1,198.3	539.8	33,296.9	89.5	62.5	366.0	1,404.3	92.9	38.6	2,053.8
Asphalt & Road Oil			1,076.5				1,076.5							
Aviation Gasoline				41.7			41.7				2.9			2.9
Distillate Fuel Oil	830.9	481.2	1,131.3	3,675.8	83.6	71.4	6,274.2	60.2	34.9	81.7	255.4	6.1	5.2	443.3
Jet Fuel				3,025.0		78.2	3,103.2				166.5		5.5	172.0
Kerosene	72.3	12.1	11.4			2.8	98.6	5.2	0.9	0.8			0.2	7.1
LPG	389.5	68.7	1,749.3	19.9		13.8	2,241.2	24.1	4.3	59.9	1.2		0.9	90.4
Lubricants			166.7	157.5		0.6	324.8			11.1	10.5		+	21.7
Motor Gasoline		85.1	193.3	13,488.3		124.7	13,891.3		6.0	13.6	950.4		8.8	978.8
Residual Fuel		211.9	333.9	1,025.9	1,085.3	134.6	2,791.7		16.5	23.6	17.5	83.9	10.5	152.0
Other Petroleum						113.8	113.8						7.5	7.5
AvGas Blend Components			(0.1)				(0.1)			+				+
Crude Oil			38.9				38.9			2.9				2.9
MoGas Blend Components			(25.9)				(25.9)			(1.8)				(1.8)
Misc. Products			152.6				152.6			+				+
Naphtha (<401 deg. F)			298.9				298.9			8.4				8.4
Other Oil (>401 deg. F)			827.2				827.2			25.2				25.2
Pentanes Plus			294.0				294.0			17.8				17.8
Petroleum Coke			625.8		29.3		655.1			60.0		3.0		63.0
Still Gas			1,426.3				1,426.3			89.5				89.5
Special Naphtha			88.0				88.0			6.3				6.3
Unfinished Oils			(450.1)				(450.1)			(33.0)				(33.0)
Waxes			35.1				35.1			+				+
Geothermal					54.9		54.9					0.4		0.4
TOTAL (All Fuels)	6,012.7	3,790.1	17,841.6	22,054.0	20,902.2	547.5	71,148.1	339.6	222.3	943.5	1,437.1	1,804.7	39.3	4,786.4

^a Expressed as gross calorific values (i.e., higher heating values).

^b Consumption and/or emissions of select fuels are shown as negative due to differences in EIA energy balancing accounting. These are designated with parentheses.

^c Adjustments include: international bunker fuel consumption (see Table A-13) and carbon in non-energy products (see Table A-14).

+ Absolute value does not exceed 0.05 Tg CO₂ Eq.

NE (Not Estimated)

Table A-12: 1990 Energy Consumption Data and CO₂ Emissions from Fossil Fuel Combustion by Fuel Type

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Fuel Type	Consumption (Tbtu) ^a							Emissions ^b (Tg CO ₂ Eq.) including Adjustments ^c and Fraction Oxidized						
	Res.	Comm.	Ind.	Trans.	Elec.	Terr.	Total	Res.	Comm.	Ind.	Trans.	Elec.	Terr.	Total
Total Coal	26.0	129.0	1,632.9	NE	16,245.0	7.0	18,040.0	2.5	12.3	151.6	NE	1,530.3	0.6	1,697.3
Residential Coal	26.0						26.0	2.5						2.5
Commercial Coal		129.0					129.0		12.3					12.3
Industrial Coking Coal			21.0				21.0			0.5				0.5
Industrial Other Coal			1,606.9				1,606.9			150.6				150.6
Coke Imports			5.0				5.0			0.5				0.5
Transportation Coal				NE			NE							NE
Utility Coal					16,245.0		16,245.0					1,530.3		1,530.3
U.S. Territory Coal (bit)						7.0	7.0						0.6	0.6
Natural Gas	4,523.0	2,701.0	8,133.9	680.0	3,321.0		19,358.9	238.8	142.6	419.9	35.9	175.3		1,012.5
Total Petroleum	1,263.1	913.2	8,210.8	21,775.8	1,278.0	461.5	33,902.5	87.6	66.6	383.7	1,434.6	99.0	33.1	2,104.5
Asphalt & Road Oil			1,170.2				1,170.2							
Aviation Gasoline				45.0			45.0				3.1			3.1
Distillate Fuel Oil	834.2	485.3	1,170.6	3,829.4	95.5	74.0	6,489.1	60.4	35.1	84.5	265.9	6.9	5.4	458.2
Jet Fuel				3,129.5		61.0	3,190.5				173.8		4.3	178.1
Kerosene	63.9	11.8	12.3			2.6	90.6	4.6	0.8	0.9			0.2	6.5
LPG	365.0	64.4	1,607.8	21.6		14.4	2,073.3	22.6	4.0	57.1	1.3		0.9	85.9
Lubricants			186.3	176.0		0.7	363.0			12.4	11.7		+	24.2
Motor Gasoline		111.2	185.2	13,559.0		101.0	13,956.4		7.8	13.0	955.3		7.1	983.3
Residual Fuel		240.4	411.2	1,015.4	1,152.9	121.8	2,941.7		18.8	30.2	23.4	89.1	9.5	171.0
Other Petroleum						86.0	86.0						5.7	5.7
AvGas Blend Components			0.2				0.2			+				+
Crude Oil			50.9				50.9			3.7				3.7
MoGas Blend Components			53.7				53.7			3.8				3.8
Misc. Products			137.9				137.9			+				+
Naphtha (<401 deg. F)			347.9				347.9			9.6				9.6
Other Oil (>401 deg. F)			754.2				754.2			22.8				22.8
Pentanes Plus			250.4				250.4			13.4				13.4
Petroleum Coke			626.9		29.6		656.5			58.8		3.0		61.8
Still Gas			1,473.7				1,473.7			92.6				92.6
Special Naphtha			107.1				107.1			7.7				7.7
Unfinished Oils			(369.1)				(369.1)			(27.0)				(27.0)
Waxes			33.3				33.3			+				+
Geothermal					52.9		52.9					0.4		0.4
TOTAL (All Fuels)	5,812.1	3,743.2	17,977.6	22,455.8	20,896.9	468.6	71,354.2	328.9	221.4	955.3	1,470.5	1,805.0	33.7	4,814.8

^a Expressed as gross calorific values (i.e., higher heating values).^b Consumption and/or emissions of select fuels are shown as negative due to differences in EIA energy balancing accounting. These are designated with parentheses.^c Adjustments include: international bunker fuel consumption (see Table A-13) and carbon in non-energy products (see Table A-14).+ Absolute value does not exceed 0.05 Tg CO₂ Eq.

NE (Not Estimated)

Table A-13: 2001 CO₂ Emissions From International Bunker Fuel Consumption

Fuel Type	Bunker Fuel Consumption (TBtu)	Carbon Content Coefficient (Tg Carbon/QBtu) ¹	Potential Emissions (Tg Carbon)	Fraction Oxidized	Emissions (Tg CO ₂ Eq.)
Distillate Fuel Oil	72	19.95	1.4	0.99	5.2
Jet Fuel	839	19.33	16.2	0.99	58.9
Residual Fuel Oil	426	21.49	9.2	0.99	33.2
Total	1,337		26.8		97.3

Note: See Annex J for additional information on military bunkers.

Table A-14: 2001 Carbon In Non-Energy Products

1	2	3	4	5	6	7	8
Fuel Type	Non-energy Use ^a (TBtu)	Carbon Content Coefficient (Tg Carbon/QBtu)	Potential Carbon (Tg)	Adjusted Potential Carbon ^b (Tg)	Fraction Sequestered	Carbon Stored (Tg)	Carbon Stored (Tg CO ₂ Eq.)
Industry	5,328.6		99.9	98.2		68.1	249.7
Industrial Coking Coal	24.9	25.63	0.6	0.6	0.75	0.5	1.8
Natural Gas	333.9	14.47	4.8	4.7	0.61	2.8	10.4
Asphalt & Road Oil	1,257.6	20.62	25.9	25.9	1.00	25.9	95.1
LPG	1,690.4	16.88	28.5	27.7	0.61	16.8	61.7
Lubricants	174.3	20.24	3.5	3.5	0.09	0.3	1.2
Pentanes Plus	239.2	18.24	4.4	4.2	0.61	2.6	9.5
Petrochemical Feedstocks							
Naphtha (<401 deg. F)	493.7	18.14	9.0	8.7	0.61	5.3	19.4
Other Oil (>401 deg. F)	662.5	19.95	13.2	12.9	0.61	7.8	28.7
Still Gas	31.0	17.51	0.5	0.5	0.80	0.4	1.6
Petroleum Coke	113.2	27.85	3.2	3.2	0.50	1.6	5.8
Special Naphtha	78.5	19.86	1.6	1.6	+	+	+
Other (Wax/Misc.)							
Distillate Fuel Oil	11.7	19.95	0.2	0.2	0.50	0.1	0.4
Residual Fuel	56.6	21.49	1.2	1.2	0.50	0.6	2.2
Waxes	36.3	19.81	0.7	0.7	1.00	0.7	2.6
Miscellaneous	124.9	20.29	2.5	2.5	1.00	2.5	9.3
Transportation	164.6		3.3	3.3		0.3	1.1
Lubricants	164.6	20.24	3.3	3.3	0.09	0.3	1.1
U.S. Territories	259.3		5.2	5.2		0.5	1.9
Lubricants	1.5	20.24	+	+	0.09	+	+
Other Petroleum (Misc.)	257.8	20.00	5.2	5.2	0.10	0.52	1.9
Total	5,752.5		108.5	106.7		68.9	252.8

^a To avoid double-counting, the original values reported by EIA for coal coke, petroleum coke, and natural gas consumption are adjusted for industrial process consumption. Values in this column reflect these adjustments.

^b Natural gas, LPG, Pentanes Plus, Naphthas, and Other Oils are adjusted to account for exports of chemical intermediates derived from these fuels. Values in this column reflect these adjustments.

+ Does not exceed 0.05 Tg or Tg CO₂ Eq.

¹ One QBtu is one quadrillion Btu, or 10¹⁵ Btu. This unit is commonly referred to as a “Quad.”

Table A-15: Key Assumptions for Estimating Carbon Dioxide Emissions

Fuel Type	Carbon Content Coefficient (Tg Carbon/QBtu)	Fraction Oxidized
Coal		
Residential Coal	[a]	0.99
Commercial Coal	[a]	0.99
Industrial Coking Coal	[a]	0.99
Industrial Other Coal	[a]	0.99
Coke Imports	27.85	0.99
Transportation Coal	NC	NC
Utility Coal	[a]	0.99
U.S. Territory Coal (bit)	25.14	0.99
Natural Gas	14.47	0.995
Petroleum		
Asphalt & Road Oil	20.62	0.99
Aviation Gasoline	18.87	0.99
Distillate Fuel Oil	19.95	0.99
Jet Fuel	[a]	0.99
Kerosene	19.72	0.99
LPG	[a]	0.995
LPG (energy use/Territories)	[a]	0.995
LPG (non-energy use)	[a]	-
Lubricants	20.24	0.99
Motor Gasoline	[a]	0.99
Residual Fuel Oil	21.49	0.99
Other Petroleum		
AvGas Blend Components	18.87	0.99
Crude Oil	[a]	0.99
MoGas Blend Components	[a]	0.99
Misc. Products	[a]	0.99
Misc. Products (Territories)	20.00	0.99
Naphtha (<401 deg. F)	18.14	0.99
Other Oil (>401 deg. F)	19.95	0.99
Pentanes Plus	18.24	0.99
Petrochemical Feedstocks	19.37	0.99
Petroleum Coke	27.85	0.99
Still Gas	17.51	0.99
Special Naphtha	19.86	0.99
Unfinished Oils	[a]	0.99
Waxes	19.81	0.99
Geothermal	2.05	1.00

Sources: Carbon coefficients from EIA. Combustion efficiency for coal from Bechtel (1993) and for petroleum and natural gas from IPCC (IPCC/UNEP/OECD/IEA 1997).

- Not applicable

NC (Not Calculated)

[a] These coefficients vary annually due to fluctuations in fuel quality (see Table A-16).

Table A-16: Annually Variable Carbon Content Coefficients by Year (Tg Carbon/QBtu)

Fuel Type	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Residential Coal	26.23	26.30	26.42	26.19	26.12	26.16	26.06	25.93	26.09	26.02	26.04	26.04
Commercial Coal	26.23	26.30	26.42	26.19	26.12	26.16	26.06	25.93	26.09	26.02	26.04	26.04
Industrial Coking Coal	25.55	25.56	25.55	25.53	25.57	25.57	25.56	25.60	25.62	25.60	25.63	25.63
Industrial Other Coal	25.82	25.89	25.87	25.77	25.77	25.80	25.75	25.76	25.79	25.80	25.74	25.74
Utility Coal	25.95	25.97	25.99	25.87	25.88	25.92	25.92	25.91	25.93	25.97	25.98	25.98
LPG	16.99	16.98	16.99	16.97	17.01	17.00	16.99	16.99	16.99	16.99	16.99	16.99
LPG (energy use/Territories)	17.21	17.21	17.21	17.22	17.22	17.20	17.20	17.18	17.18	17.18	17.18	17.18
LPG (non-energy use)	16.83	16.84	16.84	16.80	16.88	16.87	16.86	16.88	16.87	16.88	16.87	16.88
Motor Gasoline	19.41	19.41	19.42	19.43	19.45	19.38	19.36	19.35	19.33	19.33	19.34	19.34
Jet Fuel	19.40	19.40	19.39	19.37	19.35	19.34	19.33	19.33	19.33	19.33	19.33	19.33
MoGas Blend Components	19.41	19.41	19.42	19.43	19.45	19.38	19.36	19.35	19.33	19.33	19.34	19.34
Misc. Products	20.16	20.18	20.22	20.22	20.21	20.23	20.25	20.24	20.24	20.19	20.23	20.29
Unfinished Oils	20.16	20.18	20.22	20.22	20.21	20.23	20.25	20.24	20.24	20.19	20.23	20.29
Crude Oil	20.16	20.18	20.22	20.22	20.21	20.23	20.25	20.24	20.24	20.19	20.23	20.29

Source: EIA (2002a) and EIA (2001b)

Table A-17: Electricity Consumption by End-Use Sector (Billion Kilowatt-Hours)

End-Use Sector	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Residential	924	955	936	995	1,008	1,043	1,083	1,076	1,130	1,145	1,192	1,201
Commercial	838	855	850	885	913	953	980	1,027	1,078	1,104	1,159	1,196
Industrial	1,060	1,065	1,095	1,105	1,142	1,157	1,179	1,187	1,212	1,241	1,248	1,199
Transportation	5	5	5	5	5	5	5	5	5	5	5	6
U.S. Territories*	-	-	-	-	-	-	-	-	-	-	-	-
Total	2,827	2,880	2,886	2,989	3,069	3,157	3,247	3,294	3,425	3,495	3,605	3,602

*EIA data on fuel consumption for electricity generation does not include the U.S. territories.

- Not applicable

Source: EIA (2002a)

